Case/Docket No. 060850.P002
Express Mail No.: EM560651563US

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ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of:

Inventor: MICHAEL J. THERMOS

For: **NOZZLE**

Enclosed are:

X (2) sheet(s) of Formal Drawing(s) including (8) figures.
X An Assignment of the invention to: NITROUS OXIDE SYSTEMS, INC.
X A Declaration and Power of Attorney.
X A Verified Statement to establish Small Entity Status under 37 CFR 1.9 and 37 CFR 1.27.

The Filing Fee has been calculated as shown below:

	(Col. 1)	(Col.2)	SMALL ENTITY		OTHER THAN A SMALL ENTITY	
For:	No. Filed	No. Extra	RATE	FEE	RATE	FEE
Basic Fee:	-	-	-	$395.00	-	$790.00
Total Claims:	11-20	-0-	x $11.00		x $22.00	-0-
Indep. Claims:	-3	-0-	x $41.00		x $82.00	-0-
☐ Multiple Dep. Claim(s) Presented			+ $135.00		+ $270.00	-0-
* If the difference in (Col. 1) is less than zero, enter "0" in (Col. 2)			Total:	$	Total:	$395.00

XXX A check in the amount of $395.00 to cover the filing fee is enclosed.
___ A check for $40.00 covering Recordation of the Assignment is enclosed, along with the Assignment Cover Sheet.
XXX The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to our Deposit Account No. 02-2666. A duplicate copy of this sheet is enclosed.
XXX Any additional filing fees required under 37 CFR 1.16.
XXX Any patent application processing fees under 37 CFR 1.16.
XXX The Commissioner is hereby authorized to charge payment of the following fees during the pendency of this application or credit any overpayment to our Deposit Account No. 02-2666. A duplicate copy of this sheet is enclosed.
XXX Any extension or petition fees under 37 CFR 1.17.
XXX Any filing fees under 37 CFR 1.16 for presentation of extra claims.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: 11/20/97

Thomas Coester

THOMAS M. COESTER
Reg. No. 39,637

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(310) 207-3800

Attorney Docket No.: 60850.P002
Exp. Mail No. EM560651563US

UNITED STATES PATENT APPLICATION

FOR

NOZZLE

Inventor: Michael J. Thermos

Prepared By:

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN
12400 Wilshire Blvd., 7th Floor
Los Angeles, California 90025-1026
(310) 207-3800

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

This invention relates to the field of injection systems in general and to the field of providing a nitrous oxide/fuel mixture to a combustion cylinder, in particular.

2. RELATED ART

In internal combustion engines, a mixture of air and fuel is burned in a combustion chamber (cylinder), with the force generated by the combustion being utilized to provide mechanical energy. The mechanical energy may be used to turn a drive shaft, for example. Typically, the air and the fuel are mixed in a device such as a carburetor prior to their introduction into the cylinder. In order to increase the efficiency of the combustion process, it is often desired to "inject" the fuel into the combustion chamber. In an injection system, the fuel and the air are separately introduced to the combustion chamber. There, mixing occurs and, ideally, the fuel is vaporized. Such vaporization maximizes the surface area of fuel exposed to oxygen at a given time. This increases the speed and efficiency of combustion.

For high performance it is sometimes desired to introduce nitrous oxide into the combustion chamber along with the fuel. The nitrous oxide operates as a source of oxygen for the oxidation (i.e., combustion) of the fuel. The nitrous oxide/fuel mixture is more combustible than air and fuel alone, leading to greater energy in the burn and consequently increased mechanical energy. In order to maximize the efficiency of the nitrous oxide/fuel mixture combination, it is desired to inject the mixture in an atomized form to form an aerosol comprising a multitude of small fuel droplets. In addition, it is desired to utilize the nitrous oxide as a means of atomizing the air/fuel mixture.

In a device described in U.S. Patent Nos. 4,798,190 and 4,827,888, assigned to the assignee of the present invention, a nozzle is provided that mixes and atomizes fuel with nitrous oxide. The nozzle comprises a Y-shaped housing having a pair of inlet ports and a single outlet port. One inlet port introduces fuel to the nozzle through a fuel line that extends the length of the nozzle, terminating at the outlet port. The second inlet port is used to introduce nitrous oxide into a hollow sleeve of the nozzle surrounding the fuel channel and ultimately exiting at the outlet port. The nitrous oxide is introduced at a higher pressure than the fuel, such that as the nitrous oxide exits past the end of the fuel line at the outlet port, it creates a vacuum which aids in drawing the fuel from the line. Because the fuel and the nitrous oxide are permitted to impinge upon each other within the confines of the nozzle, the mixing creates a high impact pressure near the nozzle exit. This in turn leads to chaotic turbulence in which the mixing is not even and the atomization non-optimal.

Accordingly, it is desired to provide a nozzle configuration that leads to a finer atomization of the fuel droplets and a more even mixing of the nitrous oxide and the fuel.

SUMMARY OF THE INVENTION

An injection nozzle utilizing nitrous oxide to form an aerosol with fuel in a combustion chamber is disclosed. The nozzle has a body defining a fuel channel and a nitrous oxide tube that does not communicate with the fuel channel within the body of the nozzle. The fuel channel terminates in a plurality of radially spaced fuel outlet ports surrounding an outlet port of the NO_2 tube. Fuel is introduced in the fuel channel at a pressure of approximately 3 - 12 p.s.i. Nitrous oxide is introduced in the nitrous oxide tube at a high pressure of approximately 500 - 1000 p.s.i. The nitrous oxide tube terminates flush with an outlet end of the body of the nozzle and centrally dispose relative to the plurality of annularly spaced fuel outlet ports. As a result, the NO_2 forms a jet that shears each of the fuel streams, thereby forming an aerosol with the fuel within a large volume of the combustion chamber and thus causing it to burn more efficiently. The central location of the NO_2 jet relative to the plurality of fuel ports increase the efficiency of the shearing and subsequent aerosol formation over prior art nozzles.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features as well as advantages of the different embodiments of the invention will be apparent by referring to the drawings, detailed description and claims below, where:

Figure 1 is a partial cut away plan view of an injection nozzle of one embodiment of the invention.

Figure 2 is a plan view of the outlet end of one embodiment of the invention.

Figure 3 is a cross-sectional view of one embodiment of the invention.

Figure 4 is a magnified partial sectional view of a portion of the tube and elongated region of the body member.

Figure 5 is a cut away partial sectional view of a nozzle of an alternative embodiment of the invention with fuel and oxidizing agent inlet ports shown in phantom lines.

Figure 6 is a magnified partial sectional view of the embodiment of Figure 5.

Figure 7 is a cross-sectional plan view of the embodiment of Figure 6.

Figure 8 is a partial cut-away prospective sectional view with an elongated region of one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 is a partial cut away plan view of an injection nozzle of one embodiment of the invention. A body member 10 having an elongated region 13 with a threaded region 16 disposed thereon defines an angular bore 21 and a straight bore 22 therein. The angular bore 21 intersects the straight bore 22 within body member 10. The elongated portion 13 terminates in an outlet end 9. Threaded region 16 permits easy installation in a manifold port 24 such that outlet end 9 outlets into combustion chamber 25. Coupling members 17 and 18 engage a threaded region in the straight and angular bores respectively. Coupling member 18 defines a fuel inlet port 12 in fluid communication with the angular bore 21 and engages to a threaded region (not shown) of the angular bore 21. Coupling member 17 defines an oxidizing agent inlet port 11 and engages a threaded region of the straight bore 22. A tube 20 is coupled to coupling member 17. Tube 20 extends from coupling member 17 the remaining length of the straight bore and is approximately concentric therewith. The tube 20 terminates substantially flush with outlet end 9 of the body member 10. Tube 20 defines the oxidizing agent flow path 23 and provides for constant fluid communication between inlet port 11 and outlet end 9 of the body member 10. The straight bore 22 of the body member 10 in conjunction with tube 20 define an annular region around the tube which is in fluid communication with the angular bore 21 such that when fuel is flowing, the annular region between the tube and the body walls defining the straight bore 22 is substantially filled with fuel from the intersection of the strait bore 22 and angular bore 21 to the outlet end 9.

Figure 2 is a plan view of the outlet end of one embodiment of the invention. Outlet end 9 has a central oxidizing agent port 30, the circumference of which is defined by the end of tube 20. A plurality of fuel outlet ports 31 are defined by body member 10 and radially spaced around the central oxidizing agent outlet port 30. Accordingly, in operation, nitrous oxide is expelled from central oxidizing agent outlet port 30 under high pressure, typically in the range

of 500 - 1000 p.s.i. Because the oxidizing agent chamber 25 is straight, maintaining the pressure of the oxidizing agent through the nozzle is simplified as there are no bends in the flow path to cause a pressure drop **[is this true?]**. Concurrently, a fuel stream trickles out ports 31 typically at 3 - 12 p.s.i. of each of the plurality of fuel outlet ports 31. Upon exiting the tube 20, which is flush with outlet end 9, i.e., approximately coplaner with outlet ports 31 of body member 10, the nitrous oxide rapidly expands shearing each of the fuel streams thereby forming an aerosol of nitrous oxide and fuel. Because the fuel ports are annularly spaced around the oxidizing agent port, the efficiency of aerosol formation and, therefore, combustion is greatly increased over prior art devices in which the oxidizing agent jet impinged on a single larger fuel stream.

Figure 3 is a cross-sectional view of one embodiment of the invention perpendicular to the view of Figure 1. Coupling member 17 engages threaded region 32 of straight bore 22 in body member 10. Tube 20 may, for example, be welded to coupling member 17 or formed integrally therewith. Angular bore 21 intersects the straight bore 22 to provide the fluid communication described above.

Figure 4 is a magnified partial sectional view of a portion of the tube and elongated region of the body member. Tube 20 engages the walls 33 of the central opening in the outlet end of body member 10 such that substantially no fuel leaks around the tube along walls 33. Fuel outlets ports 31 provide a path of least resistance for fuel in the annular region surrounding the tube 20.

Figure 5 is a cut away partial sectional view of a nozzle of an alternative embodiment of the invention with fuel and oxidizing agent inlet ports shown in phantom lines. The fuel introduction aspect of this embodiment is the same as in the embodiment shown in Figure 1. Specifically, a coupling member 18 defines a fuel inlet port 12 which is disposed in fluid communication with an angular bore 21 defined by body member 110. Angular bore 21

intersects straight bore 122 which is also defined within body member 110. Bore 122 has a threaded region 132 for engagement by coupling member 117. Coupling member 117 defines an oxidizing agent inlet port 111 and is coupled to tube 120 which provides a flow path 123 for an oxidizing agent introduced. In this embodiment, bore 122 is a through bore penetrating outlet end 109 of body member 110. The tube 120 has disposed on its outlet end a flange member 200. The flange member in conjunction with the walls of straight bore 122 define annular fuel outlet ports around the oxidizing agent outlet port defined by tube 120. Notably, the longitudinal dimension of flange member 200 can be arbitrarily long provided there remains sufficient fluid communication between angular bore 21 and each of the annularly spaced fuel ports defined by the conjunction of the flange member 200 and the walls of straight bore 122. In any event, at the outlet end 109 the edges of flange member 200 should engage the walls of straight bore 122 such that fuel seepage does not occur at the points of engagement. Again, the fuel outlet ports and the nitrous outlet port are substantially coplaner. In a minor variant of this embodiment body member 110 may have a lip at outlet end 109 against which flange member 200 abuts.

Figure 6 is a magnified partial sectional view of the embodiment of Figure 5. Tube member 120 having flange member 200 attach thereto is substantially flush with outlet end 109 of body member 110. Additionally, flange member 200 engages the walls defining straight bore 122 within body member 110.

Figure 7 is a cross-sectional plan view of the embodiment of Figure 6. Flange member 200 is shown coupled to tube 120 and engaging the walls of straight bore 122.

Figure 8 is a partial cut-away perspective sectional view with an elongated region of one embodiment of the invention. In Figure 8 an alternative flange member 201 is coupled to tube 120. Flange member 201 engages the walls of bore 122 throughout its entire circumference. Plurality of fuel outlet ports 131 are defined by flange member 201 and radially

spaced around oxidizing agent outlet port 130. Again flange member 201 can have an arbitrarily great longitudinal dimension provide fluid communication between each fuel outlet port 131 and the fuel entering the angular bore 21 is maintained.

While the above described embodiments can be manufactured from many different metals including brass and aluminum, it is preferred that the body member, the coupling members and the tube be stainless steel. Machining the above nozzle from stainless steel results in a nozzle having improved durability in the high stress environment in which the nozzles are used.

In the foregoing specification, the invention has been described with reference to specific embodiments thereof. It will, however, be evident that various modifications and changes can be made thereto without departing from the broader spirit and scope of the invention as set forth in the appended claims. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense. Therefore, the scope of the invention should be limited only by the appended claims.

CLAIMS:

What is claimed is:

1. A nozzle comprising;

a body member having an in inlet end and an outlet end, the body member defining an angular bore and a straight bore, the angular bore intersecting the straight bore and terminating at an inlet end such that fluid communication exists between the inlet end of the angular bore and the straight bore;

a tube concentric with the straight bore and terminating substantially flush with the outlet end of the body member and in fluid communication with an inlet end of the straight bore wherein the tube and body member in combination define an annular channel around the tube and a plurality of radially spaced outlet ports distributed around a central outlet port.

2. The nozzle of claim 1 wherein the body member is stainless steel.

3. The nozzle of claim 1 wherein the outlet end of the body member defines the radially spaced outlet ports and a center bore of a size to receive and engage the tube such that fluid communication through the center bore around the tube is prevented.

4. The nozzle of claim 1 wherein the body member defines a single hole in the outlet end, and further comprising:

a flange member coupled to the tube and concentric with the tube the flange member engaging a portion of the body defining the single hole, the flange member for causing annular disbursement of fuel around the central outlet port.

5. The nozzle of claim 1 further comprising:

a first coupling member engaging the inlet end of the angular bore and defining a fuel inlet port; and

a second coupling member engaging the inlet end of the straight bore and defining an oxidizing agent inlet port, the second coupling member coupled to the tube.

6. The nozzle of claim 5 wherein a flow path of an oxidizing agent within the nozzle is linear.

7. A nozzle comprising:

a body member defining an angular bore and a straight bore;

a first coupling member engaging an inlet end of the angular bore;

a second coupling member engaging an inlet end of the straight bore;

a tube coupled to the second coupling member and substantially concentric with straight bore wherein the nozzle defines a plurality of radially spaced outlet ports around a central outlet port.

8. The nozzle of claim 7 wherein the central outlet port and the plurality of radially spaced outlet ports are substantially coplanar.

9. The nozzle of claim 7 wherein the plurality of annularly spaced outlet ports are defined by the body member.

10. The nozzle of claim 7 wherein the plurality of annularly spaced outlet ports are defined by a flange member.

11. The nozzle of claim 7 wherein the plurality of annularly spaced outlet ports are defined by a conjunction of the body member and a flange member.

ABSTRACT

An injection nozzle utilizing nitrous oxide to form an aerosol with fuel in a combustion chamber. The nozzle has a body defining a fuel channel and a nitrous oxide tube that does not communicate with the fuel channel within the body of the nozzle. The fuel channel terminates in a plurality of radially spaced fuel outlet ports surrounding an outlet port of the NO_2 tube. Fuel is introduced in the fuel channel at a pressure of approximately 3 - 12 p.s.i. Nitrous oxide is introduced in the nitrous oxide tube at a high pressure of approximately 500 - 1000 p.s.i. The nitrous oxide tube terminates flush with an outlet end of the body of the nozzle and centrally dispose relative to the plurality of annularly spaced fuel outlet ports. As a result, the NO_2 forms a jet that shears each of the fuel streams, thereby forming an aerosol with the fuel within a large volume of the combustion chamber and thus causing it to burn more efficiently. The central location of the NO_2 jet relative to the plurality of fuel ports increase the efficiency of the shearing and subsequent aerosol formation over prior art nozzles.

Our Ref.: 060850.P002

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

NOZZLE

the specification of which

__X__ is attached hereto.
_____ was filed on _____ as
Application Serial No. _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status -- patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status -- patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status -- patented, pending, abandoned)

I hereby appoint BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, a firm including: Aloysius T. C. AuYeung, Reg. No. 35,432; William Thomas Babbitt, Reg. No. 39,591; Jordan Michael Becker, Reg. No. 39,602; Bradley J. Bereznak, Reg. No. 33,474; Michael A. Bernadicou, Reg. No. 35,934; Roger W. Blakely, Jr., Reg. No. 25,831; Gregory D. Caldwell, Reg. No. 39,926; Kent M. Chen, Reg. No. 39,630; Lawrence M. Cho, Reg. No. 39,942; Thomas M. Coester, Reg. No. 39,637; Roland B. Cortes, Reg. No. 39,152; William Donald Davis, Reg. No. 38,428; Michael Anthony DeSanctis, Reg. No. 39,957; Daniel M. De Vos, Reg. No. 37,813; Tarek N. Fahmi, Reg. No. P41,402; James Y. Go, Reg. No. 40,621; Sharmini Nathan Green, Reg. No. 41,410; Reg. No. 40,621; David R. Halvorson, Reg. No. 33,395; Eric Ho, Reg. No. 39,711; George W Hoover II, Reg. No. 32,992; Eric S. Hyman, Reg. No. 30,139; Dag H. Johansen, Reg. No. 36,172; Stephen L. King, Reg. No. 19,180; Michael J. Mallie, Reg. No. 36,591; Kimberley G. Nobles, Reg. No. 38,255; Ronald W. Reagin, Reg. No. 20,340; James H. Salter, Reg. No. 35,668; William W. Schaal, Reg. No. 39,018; James C. Scheller, Reg. No. 31,195; Charles E. Shemwell, Reg. No. 40,171; Maria McCormack Sobrino, Reg. No. 31,639; Stanley W. Sokoloff, Reg. No. 25,128; Allan T. Sponseller, Reg. No. 38,318; Steven R. Sponseller, Reg. No. 39,384; Judith A. Szepesi, Reg. No. 39,393; Edwin H. Taylor, Reg. No. 25,129; George G. C. Tseng, Reg. No. 41,355; Lester J. Vincent, Reg. No. 31,460; John Patrick Ward, Reg. No. 40,216; Ben J. Yorks, Reg. No. 33,609; and Norman Zafman, Reg. No. 26,250; my attorneys; and Robert Andrew Diehl, Reg. No. P40,992; Thomas A. Hassing, Reg. No. 36,159; and Edwin A. Sloane, Reg. No. 34,728; my patent agents, with offices located at 12400 Wilshire Boulevard, 7th Floor, Los Angeles, California 90025, telephone (310) 207-3800, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First/Sole Inventor Michael J. Thermos

Inventor's Signature Michael J. Thermos Date NOV 20, 1997

Residence Huntington Beach, California (City, State) Citizenship U.S.A. (Country)

Post Office Address 16871 Bolero
Huntington Beach, California 92649

APPLICANT OR PATENTEE: MICHAEL J. THERMOS OUR REF NO: 060850.P002

SERIAL OR PATENT NO.: _____ FILED/ISSUE DATE: _____

FOR: NOZZLE

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
37 CFR 1.9(f) AND 1.27(b) - INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled_____

_____

described in

[X] THE SPECIFICATION FILED HEREWITH.

[ ] APPLICATION SERIAL NO.: _____, FILED: _____.

[ ] PATENT NO.: _____, ISSUED: _____.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey or license any rights in the invention is listed below:

[ ] NO SUCH PERSON, CONCERN, OR ORGANIZATION

[X] PERSONS, CONCERNS, OR ORGANIZATIONS LISTED BELOW.*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

NAME: NITROUS OXIDE SYSTEMS, INC.

ADDRESS: 5930 LAKESHORE DRIVE, CYPRESS, CALIFORNIA

[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

NAME: _____

ADDRESS: _____

[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code, and that such willful false

statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

MICHAEL J. THERMOS

SIGNATURE OF INVENTOR

Nov 20, 1997

DATE

Attorney's Docket No.: 060850.P002

Applicant or Patentee: Michael J. Thermos
Serial or Patent No.: _____
Filed or Issued: _____
For: NOZZLE

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
37 CFR 1.9(P) AND 1.27(C) - SMALL BUSINESS CONCERN

I hereby declare that I am:

[XXX] the owner of the small business concern identified below:

[____] an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: NITROUS OXIDE SYSTEMS, INC.
ADDRESS OF CONCERN: 5930 LAKESHORE DRIVE,
CYPRESS CALIFORNIA 90630

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled: NOZZLE
by inventor(s): _____
described in:

[XXX] the specification filed herewith
[____] application serial no. _____, filed _____
[____] patent no. _____, issued _____

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below*, and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(c) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a non-profit organization under 37 CFR 1.9(e). *NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

NAME: _____
ADDRESS: _____
[____] Individual [____] Small Business Concern [____] Non Profit Organization

NAME: _____
ADDRESS: _____
[____] Individual [____] Small Business Concern [____] Non Profit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. [37 CFR 1.28(b)]

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: MICHAEL J. THERMOS
TITLE OF PERSON OTHER THAN OWNER: PRESIDENT
ADDRESS OF PERSON SIGNING: 5930 LAKESHORE DRIVE, CYPRESS CALIFORNIA 90630
SIGNATURE: Michael J. Thermos DATE: 11-20-97

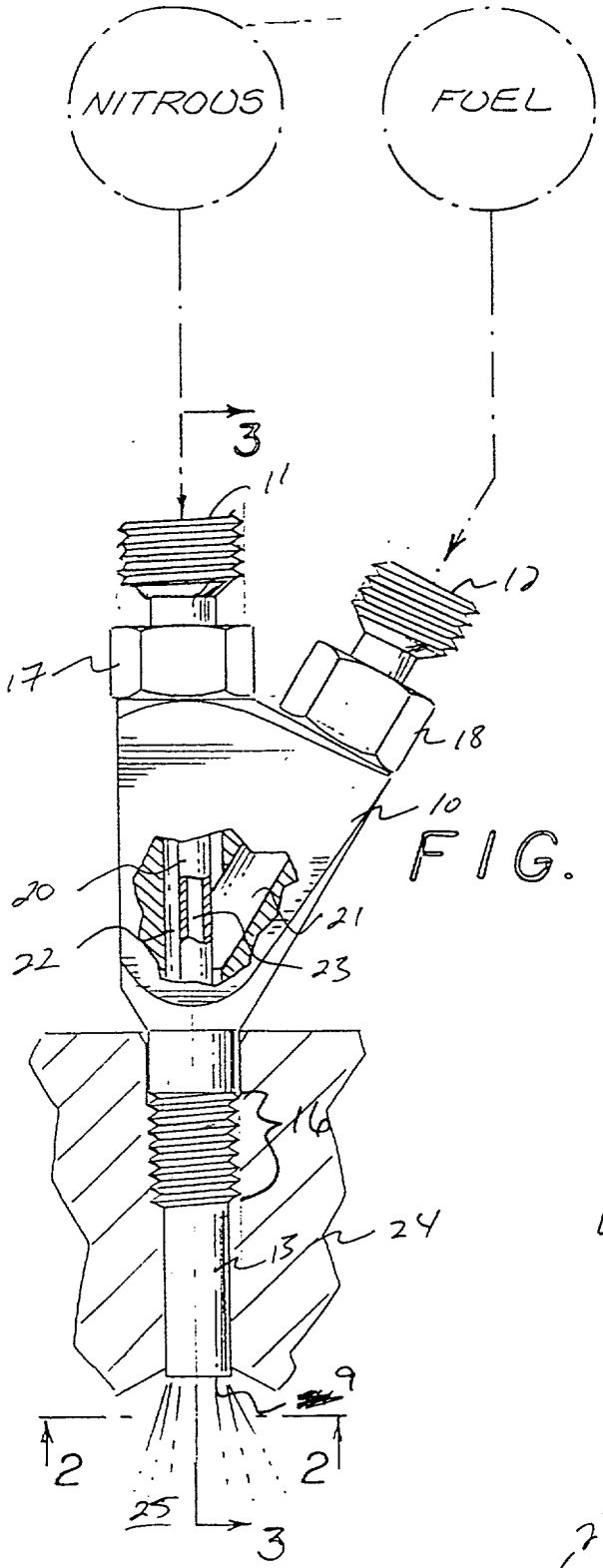

FIG. 1

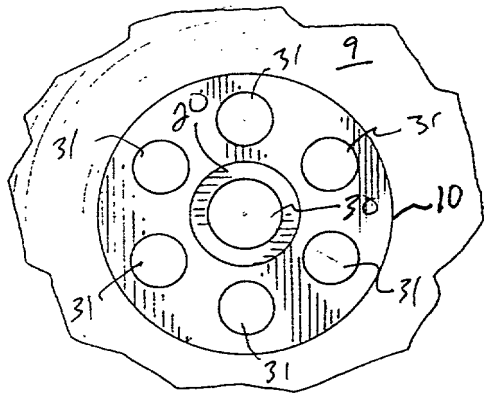

FIG. 2

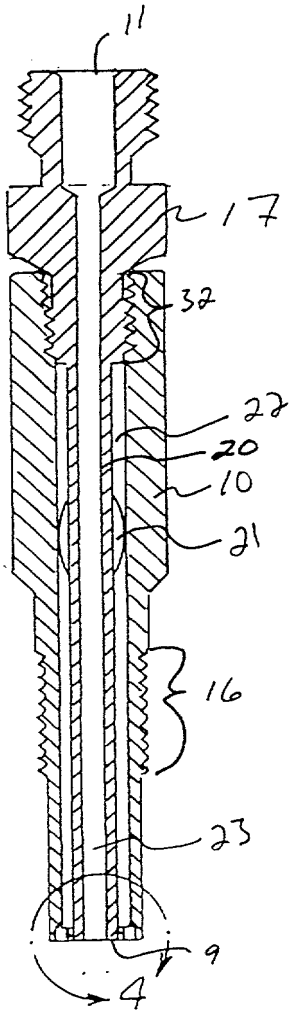

FIG. 3

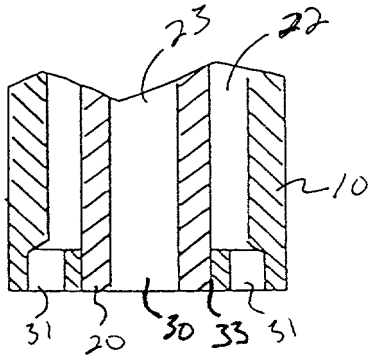

FIG. 4

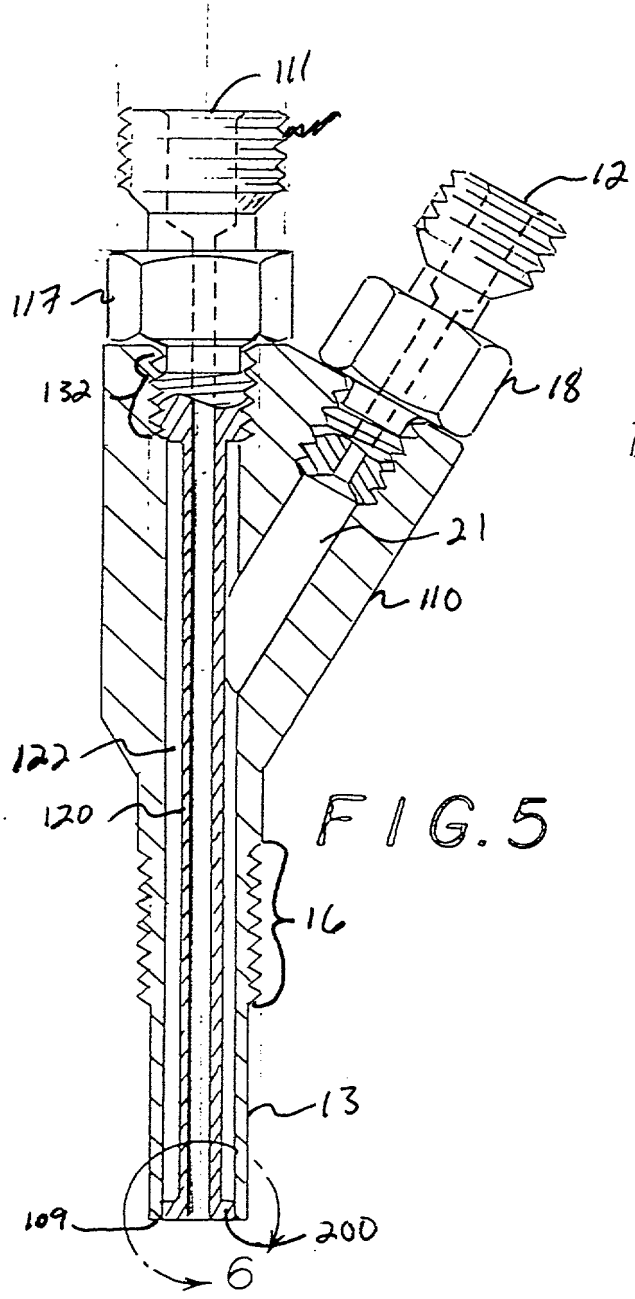

FIG. 5

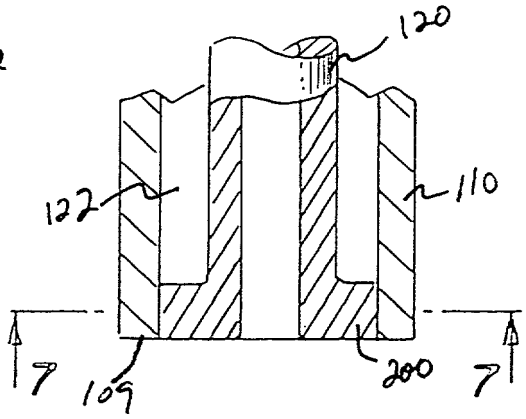

FIG. 6

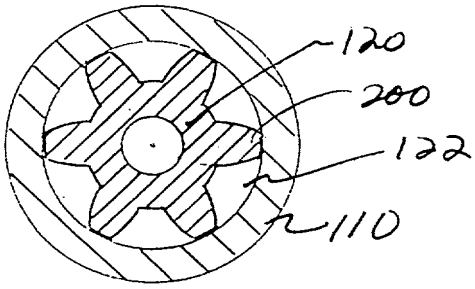

FIG. 7

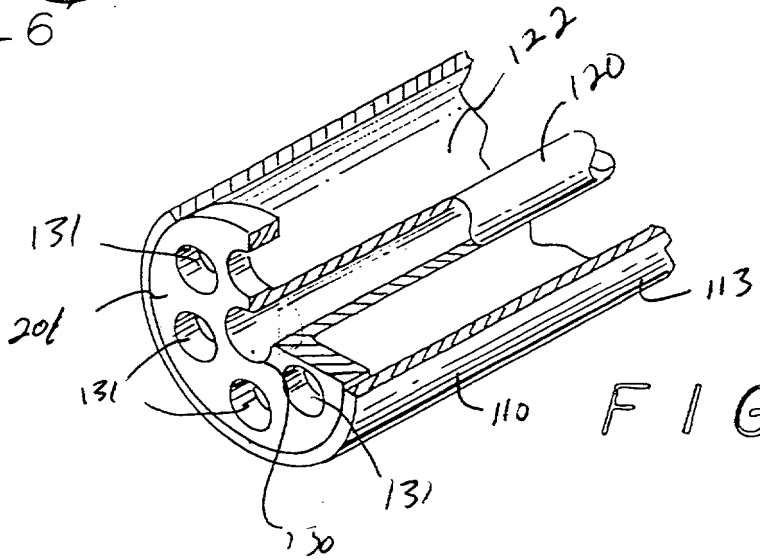

FIG. 8